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STABILITY OF UNCERTAIN SWITCHED STOCHASTIC INTEGRO-DIFFERENTIAL DELAY SYSTEMS

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Abstract. In this paper, we study the stability of uncertain switched stochastic integro-differential systems with time-delay. Some sufficient conditions of exponential stability are obtained for the uncertain stochastic delay systems. Then, we discuss the asymptotic stability of such systems. The results are also extended to nonlinear systems.

Keywords. switched systems, stochastic integro-differential systems, time-delay, exponential stability, asymptotic stability.

1 Introduction

In the last few decades, more and more mathematical models are described by stochastic differential equations and which promote greatly the development of stochastic dynamical system. In the theory of stochastic dynamical system, the stability is one of the most important issues which has been widely studied and obtained rich results (see[1-9,15, 17]).

In many practical systems (such as control, communication, computer and signal processes) include a finite continuous variable systems along with a discrete event system governing the 'switching law' among them (switched system), or time delay (delay system), or different types of uncertainties (uncertain system). Thus, there has been increasing interest in the stability analysis of switched stochastic systems (with time delay or some uncertainties), and switching control design of such systems. Basak (see[10]), Shaikhet (see[11]), Xuerong Mao (see[12,16]), Chenggui Yuan (see[13]) studied the stability of stochastic differential equation with Markovian switching. Xuerong Mao (see[14]), Jun Liu & Xinzhi Liu (see[19]) studied Robust stabilization of stochastic switched delay systems. Exponential stability of switched stochastic delay systems is studied by Jun Liu & Xinzhi Liu (see[18]) and Xuerong Mao (see[22]). Mohammed (see[21]) published a book about stochastic functional differential equations. Tseng (see[20]) and S. Xu (see[23]) studied uncertain stochastic switched delay systems.